Cochlear Implants

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During the 1990s the topic of cochlear implants has emerged as perhaps the single most divisive issue among deaf and hard of hearing people, educators, parents of deaf children, audiologists, otologists, and others concerned about the welfare and future of deaf people and the deaf community. What exactly is a cochlear implant? What are some of the major issues in the debate? Is there any possibility of a *rapprochement* among the different factions?

The primary purpose of a cochlear implant is to electrically stimulate the auditory nerve fibers in the cochlea, the fluid-filled spiral-shaped part of the inner ear. The stimulated fibers then transmit the electrical signals to the brain for interpretation (Nevins and Chute, 1996). Normally, thousands of very small hair cells in the cochlea do the job of stimulating the auditory nerve fibers. However, for many deaf people, the hair cells are not functioning, and the implant is designed to do the job of these cells. To the extent that this works, it is due to the fact that, while the cochlea is not functioning, the auditory nerve that connects the cochlea to the brain is undamaged and therefore capable of transmitting electrical impulses to the brain.

Cochlear implants have been available, in one form or another, for several decades, although newer models are much smaller and more sophisticated than earlier prototypes. Basically, cochlear implants consist of a combination of external (outside the head) and internal, surgically implanted, parts. A microphone, speech processor, transmitter and various cords make up the external segment of the system, while implanted components include a receiver and a small wire, capable of electrical stimulation, that extends into the cochlea. The two systems 'meet' above the ear where the transmitter and the implanted receiver are magnetically joined. (1)

Cochlear implants today are primarily 'multi-channel' rather than single channel. The more channels, or 'electrode sites,' within the cochlea, the more stimulation of the auditory nerve and, presumably, the greater the diversity and precision of the sound. In 1990, after several years of testing, the Food and Drug Administration gave preliminary approval for a 22-channel (Nucleus 22) device that could be implanted in both children and adults. It is this device, along with similar devices manufactured by a few other companies, that has led to the controversies which have emerged in the 1990s.

The major controversy centers around the issue of cochlear implants in children. The deaf community, led by the National Association of the Deaf (NAD), has taken a strong stand against any implantation for children. (The NAD has taken no position concerning implantation among adults.) In a 1991 position paper the NAD stated that it

> ...deplores the decision of the Food and Drug Administration [to approve implantation of the 22-channel device in children aged two to seventeen] which was unsound scientifically, procedurally, and ethically. (National Association of the Deaf, 1991)

According to the position statement, these are some of the reasons why the NAD objects to pediatric cochlear implants: The procedure is highly experimental, there is no evidence that children who receive cochlear implants learn English any better than they would with conventional hearing aids or with no aid at all, and the use of an implant could "delay the family's acceptance of

the child's deafness and their acquisition of sign communication" and thus have a negative impact on the child's future quality of life in the deaf community.

On the other side of the coin, a position statement written by the Network of Educators of Children with Cochlear Implants (NECCI) states:

> Cochlear implants are a viable alternative for improving auditory skills in hearing-impaired children who receive little or no benefit from an intensive auditory program using more conventional amplification. (Network of Educators of Children with Cochlear Implants, 1992)

Supporters of pediatric cochlear implants deny that the procedure is still experimental or that the surgery is particularly dangerous, argue that parents have a right to do what they believe is in the best interests of their deaf child even if others, particularly those in the deaf community, might object, and suggest that "...entering the hearing world may increase opportunity for education, employment, and personal relationships" (Balkany, Hodges, and Goodman, 1996, p. 750). There seems to be little room for agreement or compromise between these two positions, and, indeed, the dissension apparent earlier in the decade has escalated into a full-scale ideological war during the last few years.

Like most ideological wars, the conflict between those who support cochlear implants for children and those who do not is both very real and very intense. But the heat of the debate often obscures issues that, if discussed in a less highly-charged atmosphere, could lead to some points of mutual tolerance if not consensus. In fact, the conflict is perhaps best seen as the latest manifestation of the age-old controversy between those who emphasize oral education, with its emphasis on listening skills, lipreading, and speech training, and those who emphasize the viability of the deaf community and the importance of American Sign Language (ASL) and other forms of signed communication.

Even though pediatric cochlear implants require major surgery, they are, in the final analysis, merely a special type of hearing aid designed for those deaf children who cannot benefit from conventional aids (Cooper, 1992; Moog and Geers, 1994). And, in order for the implant to have any chance of post-operative success, years of oral training by parents, teachers and speech pathologists is necessary (House, 1994; Cohen, 1995). As Cohen points out, the goal of such training (which, in her view, could also include total communication) remains "...to help hearing-impaired individuals to obtain an education and to live and work more comfortably in what is...a predominantly hearing society" (1995, p. 3). This, of course, has long been a primary goal of oralists.

One question, of course, is, does it work? Does a cochlear implant coupled with intense oral education provide deaf children with the skills necessary to live and work in a hearing world? Does an implant help children acquire speech and language? Part of the difficulty in assessing the success of pediatric cochlear implants is the fact that, in such a highly charged atmosphere, implant advocates have an understandable desire to emphasize the successes while the critics want to focus on the failures.

It seems reasonably clear that, for some children, a cochlear implant does make it possible for them to hear sounds that they would not otherwise hear (Allen, et al., 1994). It is important to note, however, that even the strongest advocates of implants admit that, at the present time, the improvement in hearing "...does not represent anything approaching normal hearing" (Moog and Geers, 1994, p. 1). (This is true for many hearing aids as well.) It is certainly possible, however, that, with advances in technology in the years ahead, the quality of cochlear implants, like the quality of newly-introduced digital hearing aids, will improve.

The issue of language development is more complex, primarily because it is difficult if not impossible to specify exactly when one has acquired language. One definition of language is "...communication using a system of arbitrary vocal sounds, written symbols, signs, or gestures in conventional ways with conventional meanings" (*Random House Webster's College Dictionary*, 1995). By this rather broad definition, language could encompass everything from rudimentary gestures to complex, written messages. And, by using this definition, many children with cochlear implants could be said to have acquired at least some language. Whether they have acquired as much language as they might have acquired using another method, such as instruction in sign language from infancy, is still an open and vigorously debated question.

In the final analysis, it appears that too little is known about language development among deaf children for anyone to take a dogmatic stance and suggest that there is only one 'true' method for teaching or learning language (Bowe, 1998). While some children seem to benefit from implants and oral training, many other children benefit from signed communication. At this time we cannot accurately predict which children are likely to benefit from the different approaches. What is perhaps needed, on both sides of the debate, is a willingness to be somewhat more open-minded and a willingness to be more tolerant of, and accepting of, audiological and cultural diversity within the deaf and hard of hearing population.

Another issue which must be kept in mind is the fact that the vast majority of deaf children are born to parents with normal hearing. For the most part, before the birth of their child, these parents have little if any contact with deaf people, the deaf community, audiologists, speech pathologists, or anyone else associated with deafness-related issues. Moreover, once their child's deafness is diagnosed, many of these parents are upset and want to 'do something' for their child. Unfortunately, many parents have little inkling about the options that are available.

Instead of railing against the so-called 'audist establishment' (2) (Lane, 1993), the deaf community might be better served by working with those audiologists, otologists, otolaryngologists, school administrators and educators who clearly do understand and appreciate the importance of the deaf community and signed communication. The goal should be to provide parents of deaf children with a comprehensive set of options, and to make sure that parents are clearly aware of these options before deciding on a course of action. In this regard, while much research has been done, much more is still needed about the relative merits of, and the long-term consequences of, various methods of socializing and educating deaf and hard of hearing children. If parents, after weighing the consequences of their decision, decide on an implant for their deaf child, it is not for the deaf community to condemn the decision, but to respect it and to wish the parents, and the child, well. Perhaps, like thousands of hearing aid users, at some future date the child will elect to learn ASL and become a part of the deaf community. (3)

Harlan Lane, one of the most vocal critics of pediatric cochlear implants and the chair of the NAD task force which wrote the 1991 position paper, has said that "this is a magnificent time to be deaf" (Lane, 1994). While Lane was referring primarily to those deaf people who use ASL and are part of the deaf community, there is no question that there are many opportunities and options for *all* deaf and hard of hearing people today that were not available just a few years ago. Lane, as well as many culturally deaf people, would not want to include cochlear implants as one of these options, at least for prelingually deaf children. However, pediatric cochlear implants are a fact of life, and they will in all likelihood continue to be one of the options considered by parents of deaf children. (4)

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Endnotes

1. Cochlear implant surgery involves, first of all, shaving part of the head and making a several-inch-long U-shaped incision behind the ear (only one ear receives the implant). A flap of skin is then raised to expose the mastoid bone. The surgeon drills a small hole through the mastoid bone in order to gain access to the cochlea. A small wire, capable of stimulating the auditory nerve fibers, is then extended into the cochlea. Except in very young children, a small "bed" is created at the base of the skull in order to accommodate the receiver. The flap of skin is sewn over the imbedded receiver and, after healing, the receiver is magnetically connected to the external transmitter which, in turn, is connected to the microphone and speech processor.

2. The 'audist establishment' is a phrase used by Lane (1992) to describe a nebulously defined

collection of hearing counselors, social workers, audiologists, otologists, speech pathologists, educators and school administrators. According to Lane, this establishment has systematically taken advantage of deaf people, frequently for its own benefit, is largely responsible for the unacceptably low level of academic achievement among many deaf children, and actively conspires against changes which, he suggests, would lead to many improvements in the lives of deaf people.

3. Apparently, as Rose, et al. (1996) point out, this has already happened for a number of children who have received cochlear implants.

4. At least this will be the case in the United States, Europe, and Australia, areas where expensive cochlear implant technology will continue to be available. What, if anything, this technology will mean for the millions of deaf children and adults in developing nations is an issue that has not been adequately addressed.